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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/040,226	FEE ET AL.
	Examiner	Art Unit
	Christina Y. Leung	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-104* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *31-34,37,53-59,98-101 and 104* is/are allowed.

6)☒ Claim(s) *1-30,35,36,38-52,60-97,102 and 103* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 6 is objected to because of the following informalities:

Claim 6 recites "wherein the first supplemental signal includes a modulation..." in lines 6-7 of the claim. Examiner respectfully suggests that Applicants remove the word "first" from this phrase, because although the claim recites two supplemental signal *detectors* (called "first" and "second"), the claim only recites one supplemental signal (lines 8-9 of the claim only refer the signal as "the supplemental signal," for example).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 16-19, 38-41, 43, 45, 46, 60-64, 66-69, and 82-86 are rejected under 35 U.S.C. 102(b) as being anticipated by Konishi (US 6,101,010 A).

Regarding claim 1, Konishi discloses an optical switch (matrix switch 3 in Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports (transmission lines 51-53) and at least one optical switching element 31 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port (i.e., to an output of switch 31), the optical switch further comprising:

a supplemental signal detector (including o/e converter 421, variable band-pass filter 431, and detector 441 in Figure 2) coupled to the second optical signal port for detecting a supplemental signal associated with the optical signal (column 3, lines 11-18), wherein the supplemental signal includes a modulation applied to the optical signal. Figure 1 shows how each of the optical signals on the input ports of the switch 31 includes a supplemental signal comprising a modulation applied to the transmitted optical signal (using modulator 21; column 2, lines 16-36).

Regarding claim 2, Konishi discloses that the optical switch receives information about at least one attribute of the detected supplemental signal from the supplemental signal detector (specifically, information about the level of the detected supplemental signal) and issues a fault indication if the attribute does not meet an expected criterion (column 3, lines 11-26).

Regarding claim 16, Konishi discloses an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 31 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injector (modulator 21 in Figure 1) coupled to the first optical signal port for adding a supplemental signal associated with the optical signal, wherein the supplemental signal includes a modulation applied to the optical signal (column 2, lines 16-36).

Examiner again notes that each of the input ports to the switch element 31 in Figure 2 receives an optical signal with a supplemental signal such as created by the elements shown in Figure 1.

Regarding claim 17, Konishi discloses that the switch includes a supplemental signal detector (including o/e converter 421, variable band-pass filter 431, and detector 441 in Figure 2) coupled to the second signal port for detecting the supplemental signal associated with the optical signal (column 3, lines 11-18).

Regarding claim 18, Konishi discloses that the supplemental signal detector determines information about at least one attribute of the detected supplemental signal (specifically, information about the level of the detected supplemental signal) and the optical switch issues a fault indication based upon whether the attribute meets and expected criterion (column 3, lines 11-26).

Regarding claim 19, Konishi discloses that the optical switch determines the value of at least one attribute of the supplemental signal injected by the supplemental signal injector (specifically, the value of the level of the detected supplemental signal) and receives information about the value of the attribute detected in the supplemental signal from the supplemental signal detector (through alarm processing circuit 46 and switching information generator 32) and issues a fault indication based upon whether the value of the attribute detected by the supplemental signal detector agrees with the value of the attribute imparted by supplemental signal injector (column 3, lines 11-26). Konishi discloses that the switch has a determined expected/threshold value associated with the supplemental signal injected and received by the switch, and the system determines whether the value detected by detectors 441-443 agrees with the expected value (column 3, lines 15-18).

Regarding claim 38, Konishi discloses in an optical network (Figure 2) comprising at least one optical switch (i.e., matrix switch 3 including a switch element 31), a method for verifying optical signal routing comprising the steps of:

providing in the network at least one optical signal having at least one attribute of known value conveyed by a component of the one optical signal (using the transmitter 1 and modulator 2 in Figure 1; column 2, lines 16-36);

directing the network to route the optical signal to a first port of the optical switch (via an incoming line 51 to switch 31, for example);

directing the optical switch to couple the first port to the second port;

at a second port of the optical switch, sensing the attribute of the optical signal and determining a detected value for the attribute (using o/e converter 421 and variable band-pass filter 431 to sense the attribute; column 3, lines 6-15);

comparing the detected value of the attribute to the known value of the attribute (using detector 441; column 3, lines 15-18); and

determining whether the optical signal is being routed correctly based at least upon whether the detected value agrees with the known value (using alarm processing circuit 46; column 3, lines 19-29).

Regarding claim 39, Konishi discloses that the attribute of known value relates to at least one supplemental signal associated with the optical signal (supplied by modulator 21 in Figure 1) and the detector determines the detected value of the attribute by detecting the supplemental signal (column 3, lines 11-18).

Regarding claim 40, Konishi discloses, in an optical network comprising at least one optical switch (matrix switch 3 including a switch element 31 in Figure 2), a method for verifying optical signal routing comprising the steps of:

providing at least one optical signal at a first port of the optical switch (via transmission line 51, for example), the optical signal having at least one attribute of known value conveyed by a component of the one optical signal (using the transmitter 1 and modulator 2 in Figure 1; column 2, lines 16-36);

at a second port of the optical switch, sensing the attribute of the optical signal and determining a detected value for the attribute (using o/e converter 421 and variable band-pass filter 431 to sense the attribute; column 3, lines 6-15);

comparing the detected value to the known value (column 3, lines 15-18); and

determining whether the first port is optically coupled to the second port based upon whether the detected value agrees with the known value (column 3, lines 19-26).

Regarding claim 45, Konishi discloses that the providing the optical signal is accomplished by providing the optical signal in the network (using transmitter 1 and modulator 2 in Figure 1) and directing the signal through the network to the first port of the optical switch. The signals provided by the elements in Figure 1 are transmitted to an optical line that is ultimately associated with a first port in switch 31 (column 2, lines 16-40).

Regarding claims 41 and 46, Konishi discloses that the attribute of known value relates to a supplemental signal associated with the optical signal (provided by modulator 21 in Figure 1) and the detector determines the detected value of the attribute by detecting the supplemental signal (column 3, lines 11-18).

Regarding claim 43, Konishi discloses that the providing of the at least one optical signal at the first port of the optical switch is accomplished by coupling a supplemental signal injector (including modulator 21) to an optical line associated with the first port. Again, the signals provided by the elements in Figure 1 are transmitted to an optical line that is ultimately associated with a first port in switch 31 (column 2, lines 16-40).

Regarding claim 60, Konishi discloses in an optical network comprising at least one optical switch (matrix switch 3 including a switch element 31 in Figure 2), a method for determining optical path integrity, comprising the steps of:

providing, to a first port of the optical switch, at least one optical signal having associated therewith at least one supplemental signal, wherein the one supplemental signal includes a modulation applied to the one optical signal (using the transmitter 1 and modulator 2 in Figure 1; column 2, lines 16-36);

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port, detecting the supplemental signal and determining a first detected value for at least one attribute of the supplemental signal (using o/e converter 421 and variable band-pass filter 431 to sense the attribute; column 3, lines 6-15);

at the second port, detecting the supplemental signal and determining a second detected value for the attribute of the supplemental signal, wherein the second detected value is determined at a different time than the first detected value (again the same detecting elements); and

determining whether the carrying of the optical signal in the network has varied based at least upon comparison of the first detected value to the second detected value.

Konishi discloses that the supplemental signal may be detected and examined repeatedly during the operation of the switch (column 3, lines 19-30). It would be well understood that Konishi discloses that the user may determine that the carrying of the optical signal in the network has varied based at least upon comparison of the first detected value to the second detected value (i.e., if a second detected value indicated an error, while the earlier first detected value did not, a user would determine that an error had occurred since the detecting of the first value, and that the carrying of the signal had "varied").

Regarding claim 61, Konishi discloses in an optical network comprising at least one optical switch (matrix switch 3 including a switch element 31 in Figure 2), a method for determining optical path integrity, comprising the steps of:

providing, to a first port of the optical switch, at least one optical signal having associated therewith at least one supplemental signal having at least one attribute, wherein the one supplemental signal includes a modulation applied to the one optical signal (using the transmitter 1 and modulator 2 in Figure 1; column 2, lines 16-36);

establishing a first value for the attribute applicable to the optical signal upon entry to the first port (the control circuit 23, oscillator 22, and modulator 21 shown in Figure 1 set a first value for the supplemental signal that is predetermined by users as desired);

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port, detecting the supplemental signal and determining a second value for the attribute (using o/e converter 421 and variable band-pass filter 431 to sense the attribute; column 3, lines 6-15);

at a first instant in time, computing a first difference value between the first value and the

second value (column 3, lines 15-18);

determining optical path integrity based upon the first difference value (column 3, lines 19-26).

Kinishi disclose that the second value is compared to a predetermined threshold that is necessarily based on the original first value and determines optical path integrity based upon this comparison (i.e., "difference value"; column 3, lines 15-26).

Regarding claim 62, Konishi discloses that the attribute is related to amplitude (i.e., the power level of the signal; column 3, lines 15-18).

Regarding claims 63 and 64, Konishi discloses that the attribute is also "related" to wavelength or the frequency of the supplemental signal, in that the supplemental signal is specifically a particular frequency associated with a particular wavelength division multiplexed signal (column 2, lines 32-35), and Konishi discloses detecting a particular frequency of a supplemental signal (using variable band-pass filter 431, for example, as part of determining the optical path integrity (column 3, lines 12-15).

Regarding claim 66, Konishi discloses that the first value is established by providing a supplemental signal wherein the first value is accurately set to a specific value (column 2, lines 16-36).

Regarding claim 67, Konishi discloses, at a second instant in time distinct from the first instant in time, determining a second difference value in the same manner as the determining of the first difference value; and determining optical path integrity based at least upon comparison among the first and second difference values. As similarly discussed above with regard to claim 60, Konishi discloses that the supplemental signal may be detected and examined repeatedly

during the operation of the switch (column 3, lines 19-30). It would be well understood that they disclose that the user may determine optical path integrity based at least upon comparison of the first difference value to the second difference value (i.e., if a second difference value indicated an error, while the earlier first difference value did not, a user would determine that an error had occurred since the first difference value was determined, and that the status of the system had changed).

Regarding claim 68, Konishi discloses an optical switch (matrix switch 3 including a switch element 31 in Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching means 31 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

at least one supplemental signal detecting means (including o/e converter 421, variable band-pass filter 431, and detector 441) coupled to the second optical signal port for detecting at least one supplemental signal associated with the optical signal and determining a value of at least one attribute of the supplemental signal (column 3, lines 9-18), wherein the one supplemental signal includes a modulation applied to the optical signal (provided by modulator 21 in Figure 1; column 2, lines 17-36).

Regarding claim 69, Konishi discloses attribute evaluating means (including detector 441, for example) for determining whether the value of the attribute meets at least one criterion (column 3, lines 15-18); and

fault indicating means (alarm processing circuit 46) for issuing a fault indication based upon whether the value of the attribute meets the criterion (column 3, lines 19-32).

Regarding claim 82, Konishi discloses an optical switch (matrix switch 3 including a switch element 31 in Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching means 31 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injecting means (including modulator 21 in Figure 1) coupled to an optical line associated with the first optical signal port for adding a supplemental signal associated with the optical signal, wherein the supplemental signal includes a modulation applied to the optical signal (column 2, lines 17-36).

Regarding claim 83, Konishi discloses that the switch includes a supplemental signal detecting means (including o/e converter 421, variable band-pass filter 431, and detector 441 in Figure 2) coupled to a second optical line associated with the second signal port for detecting the supplemental signal associated with the optical signal.

Regarding claim 84, Konishi discloses means (detector 441) for determining the value of at least one attribute of the detected supplemental signal from the supplemental signal detecting means (column 3, lines 15-18);; and

fault indicating means (alarm processing circuit 46) for issuing a fault indication based at least upon whether the value of the attribute does not meet at least one criterion (column 3, lines 19-32).

Regarding claim 85, Konishi discloses comparing means (detector 441) for comparing the supplemental signal as injected by the supplemental signal injecting means to the supplemental signal as detected by the supplemental signal detecting means (column 3, lines 15-

18); and

fault indicating means (alarm processing circuit 46) coupled to the comparing means for issuing a fault indication based at least upon whether the detected supplemental signal is substantially consistent with the injected supplemental signal (column 3, lines 19-32).

Regarding claim 86, Konishi discloses comparing means (detector 441) for comparing a first value of at least one attribute of the supplemental signal (i.e., the expected/threshold value) as injected by the supplemental signal injecting means to a second value of at least one attribute of the supplemental signal (i.e., the actual received value) as detected by the supplemental signal detecting means (column 3, lines 15-18); and

fault indicating means (alarm processing circuit 46) coupled to the comparing means for issuing a fault indication based at least upon whether the detected supplemental signal is substantially consistent with the injected supplemental signal (column 3, lines 19-32).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3, 42, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi.

Regarding claims 3 and 70, Konishi discloses a system as discussed above with regard to claims 1 and 2, or 68 and 69, respectively, including issuing a fault indication based on a criterion. Konishi does not explicitly disclose that the criterion is affected by information from a

source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist before the system issues a fault indication in the manner disclosed by Konishi It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system disclosed by Konishi is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

Regarding claim 42, Konishi discloses a system as discussed above with regard to claims 40 and 41, including a supplemental signal, but Konishi does not specifically disclose that the supplemental signal becomes associated with the optical signal substantially near the first port. However, Konishi does generally disclose that the supplemental signal becomes associated with the optical signal on the transmission line leading to a first port (Figure 1 shows modulator 21 providing the supplemental signal). It would be well understood in the art that the transmitting elements shown in Figure 1 may be located substantially near the switch depending on the requirements and design of the communications network. It would have been obvious to a person of ordinary skill in the art to specifically associate the supplemental signal with the optical signal "near" the first port of the switch in the system disclosed by Konishi as an engineering design choice depending on the relative locations of the transmitting elements and the switching elements.

6. Claims 4-15, 47, 48, 65, and 71-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi in view of Shiragaki (US 5,457,556 A).

Regarding claims 6 and 73, Konishi discloses an optical switch (matrix switch 3 including switch element 31 in Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 31 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal detector/detecting means (including o/e converter 421, variable band-pass filter 431, and detector 441 in Figure 2) coupled to the second optical signal port for detecting a supplemental signal associated with the optical signal.

Konishi also discloses that the supplemental signal includes a modulation applied to the optical signal (column 2, lines 17-36).

Konishi does not specifically disclose another (i.e., a "first") supplemental signal detector/detecting means coupled to the first optical signal port for detecting the supplemental signal associated with the optical signal.

However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi., and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector as taught by Shiragaki in the system disclosed by Konishi in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claims 7 and 74, Konishi discloses a supplemental signal detector including detector 441 (i.e., a means for determining) that determines information about at least one attribute of the detected supplemental signal and the optical switch issues a fault indication if the attribute does not meet an expected criterion (i.e., they disclose fault indicating means; column 3, lines 19-32), but Konishi does not specifically having a first such detector coupled to the first port. Again, Shiragaki teaches detecting signals at the first port of a similar optical switch. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector as taught by Shiragaki in the system disclosed by Konishi in order to provide further fault detection in the system.

Regarding claim 9, Konishi discloses that the optical switch receives information about at least one attribute of the detected supplemental signals from the (second) supplemental signal detector 441, and issues a fault indication based at least upon whether the information about the attribute detected in the supplemental signal agrees with the predetermined information about the attribute based on the originally transmitted supplemental signal (column 3, lines 19-32).

Regarding claim 12 in particular, Konishi discloses that the supplemental signal detector determines an amplitude value of the signal, compares it to a predetermined original amplitude value, and calculates a loss value based on the difference between these values (column 3, lines 15-18).

Regarding claims 9 and 12, Konishi discloses having a predetermined first value and again, does not specifically disclose detecting the supplemental signal in a first supplemental signal detector before the signal enters the first port of the switch, but Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi and further

including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a first supplemental detector such as suggested by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Konishi particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 10, Konishi discloses that the optical switch receives information about at least one attribute of the detected supplemental signals from a supplemental signal detector (including detector 441) and issues a fault indication if the attribute for this supplemental signal does not meet an expected criterion (column 3, lines 19-32). Again, Konishi does not specifically disclose a first such supplemental signal detectors coupled to the first port of the switch. However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. Again, it would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector as taught by Shiragaki in the system disclosed by Konishi in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claim 13, Konishi discloses that the optical switch issues a fault indication when the loss value exceeds a criterion (column 3, lines 15-32).

Regarding claims 76 and 77, Konishi discloses comparing means for comparing a first

sampling or value of at least one attribute of the supplemental signal (a predetermined threshold value, established based on the originally transmitted signal) to a second sampling/value detected at a supplemental signal detector 441 and further disclose fault indicating means for issuing a fault indication based upon whether the samplings/values are consistent (column 3, lines 15-32).

Regarding claim 78, Konishi discloses that the supplemental signal detecting means 441 determines an amplitude value of the signal and disclose establishing a first amplitude value of the signal and further discloses a loss determining means which determines a loss value by calculating a difference between the first amplitude value and the second amplitude value (column 3, lines 15-32).

Regarding claims 76-78, again, Konishi does not specifically disclose that a first supplemental detecting means determines the first amplitude value of the supplemental signal.

Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi, and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a first supplemental detector such as suggested by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Konishi, particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 79, Konishi discloses fault indicating means coupled to the loss determining means for issuing a fault indication based at least upon the loss value meets a criterion (column 3, lines 19-32).

Regarding claims 14 and 80, Konishi discloses that the criterion is based upon previous values of the loss value, since they disclose that the supplemental signal may be detected and examined repeatedly during the operation of the switch (column 3, lines 19-30). It would be well understood that they disclose that the user would determine that the carrying of the optical signal in the network has varied based at least upon comparison of the first loss value to the second loss value (i.e., if a second loss value indicated an error, while the earlier first loss value did not, a user would determine that an error had occurred since the determination of the first value had occurred).

Regarding claims 8, 11, and 15, Konishi in view of Shiragaki suggest a system as discussed above with regard to claims 6, 7, and 10-14 above, including issuing a fault indication based on a criterion. Similarly, regarding claims 75 and 81, Konishi in view of Shiragaki suggest a system as discussed above with regard to claims 73, 74, 78 and 79. Konishi do not explicitly disclose that the criterion is affected by information from a source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist before the system issues a fault indication in the manner disclosed by Konishi

It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system suggested by Konishi in view of Shiragaki is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

Regarding claim 47, Konishi discloses in an optical network comprising at least one optical switch (matrix switch 3 including switch element 31 in Figure 2), a method for verifying optical signal routing comprising the steps of:

providing in the network at least one optical signal having at least one detectable attribute, wherein the detectable attribute is associated with a modulation applied to the optical signal (using modulator 21 in Figure 1);

determining a first value corresponding to the detectable attribute at the first port of the optical switch (the predetermined threshold based on the originally transmitted supplemental signal; column 3, lines 15-18);

at the second port of the optical switch, detecting the detectable attribute and determining a second detected value for the detectable attribute (using o/e converter 421, variable band-pass filter 43, and detector 441);

determining whether the first port is optically coupled to the second port based upon whether the first detected value agrees with the second detected value (column 3, lines 15-32).

Regarding claim 48 in particular, Konishi discloses that the detectable attribute relates to a supplemental signal associated with the optical signal and discloses detecting the supplemental signal, albeit only at the second port of the switch.

Again, Konishi does not specifically additionally detecting the detectable attribute and determining a first detected value for the detectable attribute at the first port of the switch, but Shiragaki et al. teach detecting values of a signal on both sides of an optical switch (Figure 2). It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector as taught by Shiragaki in the system disclosed by Konishi in order to provide

further fault detection in the system and more thorough information to users about attributes of the signal at various locations. It also would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a detector such as taught by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Konishi., particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claim 65, Konishi disclose a method in an optical network as discussed above with regard to claim 61. However, Konishi does not specifically disclose that the first value is established by detecting the supplemental signal and determining the first value by measurement.

Similarly, regarding claims 4 and 71, Konishi discloses a system as discussed above with regard to claims 1 and 2, or 68 and 69, and Konishi further discloses determining whether the value of the attribute of the supplemental signal meets at least one criterion based upon a predetermined value of the attribute (i.e., the originally transmitted value). However, Konishi does not disclose that the value of the attribute may be specifically previously detected.

Again, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi, and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector. as taught by Shiragaki in the system disclosed by Konishi in order to provide further fault detection in the system and more thorough information to users about attributes of the signal at various locations.

Further regarding claims 4, 65, and 71, it would have been obvious to a person of ordinary skill in the art to establish a first value of the supplemental signal by detecting it prior to its entering the switch using a detector such as taught by Shirgaki as an alternative way to establish the original value of the supplemental signal in the system disclosed by Konishi, particularly if the supplemental signal were to travel a large distance between the point of its injection and the first port of the switch.

Regarding claims 5 and 72, Konishi discloses that the attribute is an amplitude level related to the supplemental signal (column 3, lines 15-18).

7. Claims 27-30, 44, and 94-97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi in view of Fatehi et al. (US 5,892,606 A).

Regarding claims 27 and 94, Konishi discloses an optical switch facilitating the verification of optical path integrity (matrix switch 3 including switch element 31 in Figure 2), comprising a plurality of optical signal ports and an optical switching matrix 31 (i.e., an optical switching means) for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, wherein the optical signal has an associated first supplemental signal originating outside of the optical switch, wherein the first supplemental signal includes a modulation applied to the optical signal (using modulator 21 in Figure 1).

Konishi does not specifically disclose supplemental signal modifying means coupled to a first optical line associated with the first optical signal port, for changing the first supplemental signal into a second supplemental signal associated with the optical signal.

However, Fatehi et al. teach that signals may be modified during transmission (Figure 2;

column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. in the system disclosed by Konishi for modifying the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the system as desired.

Regarding claims 28 and 95, Konishi discloses a supplemental signal detector/detecting means (including o/e converter 421, variable band-pass filter 43, and detector 441) coupled to the second signal port for detecting at least one supplemental signal associated with the optical signal.

Regarding claims 29 and 96, Konishi discloses that the supplemental signal detector detects the supplemental signal and disclose fault indicating means for issuing a fault indication depending at least upon whether the signal meets an expected criterion (column 3, lines 15-32).

Regarding claim 30, Konishi discloses that the optical switch determines the value of at least one attribute of the supplemental signal as it enters the first port of the switch and receives information from the supplemental signal detector 441 about the value of the attribute detected in the supplemental signal and issues a matrix fault indication depending at least upon whether the detected value of the attribute agrees with the value originally imparted to the first port of the switch (column 3, lines 15-32).

Similarly, regarding claim 97, Konishi discloses comparing means for comparing a first value for at least one attribute of the supplemental signal as it enters the first port of the switch to a second value of the attribute as detected by the supplemental signal detecting means 441; and fault indicating means coupled to the comparing means for issuing a fault indication based at

least upon whether the second value is substantially consistent with the first value (column 3, lines 15-32).

Regarding both claims 30 and 97, Konishi does not specifically disclose that the first value of the attribute is determined by a supplemental signal modifying means prior to entering the first port of the switch, but again Fatehi et al. teach that signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. in the system disclosed by Konishi for modifying the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the system as desired. In the system thus suggested by Konishi in view of Fatehi et al, the signal entering the first port of the switch would be modified, and the detector (including detector 441) disclosed by Konishi would therefore operate by comparing the detected value with the modified value entering the switch in order to properly determine any changes in the signal as it passes through the switch.

Regarding claim 44, Konishi discloses a system as discussed above with regard to claims 40 and 41, but Konishi does not specifically disclose by modifying the supplemental signal associated with the optical signal near the first port. However, Fatehi et al. disclose that signals may be modified during transmission (Figure 2; column 4, lines 16-52) as desired to provide additional supplemental signals for monitoring the system. It would have been obvious to a person of ordinary skill in the art to include supplemental signal modifying means as taught by Fatehi et al. near the first port of the switch in the system disclosed by Konishi in order to modify

the incoming supplemental signal already disclosed to include further supplemental signal information in order to monitor further aspects of the switch as desired.

8. Claims 35, 36, 102, and 103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi in view of Fatehi et al. as applied to claims 27 and 94, respectively, above, and further in view of Shiragaki.

Regarding claims 35 and 102, Konishi in view of Fatehi et al. suggest a system as discussed above with regard to claims 27 and 94 above, respectively, including detecting an attribute of the supplemental signal and issuing a fault indication depending upon whether the attribute meets an expected criterion (Konishi, column 3, lines 15-32). They do not specifically suggest that the first supplemental signal may be detected at the supplemental signal modifier/modifying means (i.e., before entering the first port of the switch). However, Shiragaki teaches an optical switch (Figure 2), similar to the one in the system disclosed by Konishi, and further including detecting means (fault detector 26) coupled to the first and second optical signal ports on opposite sides of the switch for detecting attributes of the signal. It would have been obvious to a person of ordinary skill in the art to include another supplemental signal detector at the first port of the switch such as suggested by Shiragaki in the system suggested by Konishi in view of Fatehi in order to provide further fault detection in the system and more thorough information to users about where faults may be located in the switch system.

Regarding claims 36 and 103, Konishi does not explicitly disclose that the criterion is affected by information from a source outside of the optical switch, but it would be well understood that the criterion may be predetermined by a user of the system (i.e., a "source") as desired. In other words, a user of the system may decide what conditions or criteria must exist

before the system issues a fault indication in the manner disclosed by Konishi. It would have been obvious to a person of ordinary skill in the art to specifically indicate that the criterion in the system described by Konishi in view of Fatehi et al. and Shiragaki is affected by information from a source outside of the optical switch, simply so that the user can adjust the system to register the faults properly. It also would have been obvious to a person of ordinary skill in the art to include communicating means of some sort in order to allow the user to provide the proper input to the system for adjusting the criterion.

9. Claims 20-26, 49-52, and 87-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerstel et al. (US 5.867.289 A) in view of Fee (US 6,108,113 A).

Regarding claims 20 and 87, Gerstel et al. disclose an optical switch (Figure 2) facilitating the verification of optical path integrity, comprising a plurality of optical signal ports and at least one optical switching element 204 for causing an optical signal incident along a first optical signal port to be transmissively coupled to a second optical signal port, the optical switch further comprising:

a supplemental signal injector/injecting means 201 coupled to the first optical signal port for adding a supplemental signal associated with the optical signal.

Gerstel et al. does not specifically disclose that the optical signal has an associated other (i.e., a "first") supplemental signal originating outside of the optical switch.

However, Fee teaches that a signal in an optical network may include an associated supplemental signal (Figure 9 shows how ancillary data 905 can be introduced as a first supplemental signal to an optical signal). Fee also discloses that this first supplemental signal includes a modulation applied to a main optical signal (column 11, lines 22-55). Fee further

discloses that this first supplemental signal may be used to provide many different types of supplemental information as desired (column 13, lines 29-60).

For clarity, Examiner respectfully notes that claim 20 includes limitations regarding two supplemental signals; Fee teaches providing a "first" supplemental signal including a modulation applied on an optical signal, while Gerstel et al. disclose a "second" supplemental signal provided by a signal injector coupled to the switch.

Regarding claims 20 and 87, it would have been obvious to a person of ordinary skill in the art to include a first supplemental signal as taught by Fee in the system disclosed by Gerstel et al. in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch (as disclosed by Gerstel et al.).

Regarding claims 21 and 88, Gerstel et al. disclose a supplemental signal detector/detecting means 210 coupled to the second signal port for detecting at least one of the supplemental signals associated with the optical signal.

Regarding claims 22, 89, and 90, Gerstel et al. disclose that the optical switch determines the value of at least one attribute of the second supplemental signal injected by the supplemental signal injector (column 4, lines 35-39) and receives information from the supplemental signal detector about the value of the attribute detected in the second supplemental signal and issues a fault indication based upon whether the value of the detected attribute value agrees with the value of the attribute imparted by supplemental signal injector (i.e., the expected value of the attribute; column 6, lines 30-43; column 7, lines 3-18). Regarding claims 89 and 90 in particular, it would be well understood that Gerstel disclose means for perform the above functions, i.e.,

comparing means for determining whether the detected and expected values agree and fault indication means.

Regarding claim 23, Gerstel et al. disclose detecting a supplemental signal and issuing a fault indication if it does not meet an expected criterion, but again, they do not specifically disclose two supplemental signals. However, again Fee teaches including a supplemental signal for carrying additional information, and Fee further teaches detecting this signal and issuing a fault indication or warning based on it if necessary (column 14, lines 13-19). It would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

Regarding claims 24 and 91, it would have been obvious to a person of ordinary skill in the art to ensure that the supplemental signals were different from each so that they could be separately used for providing different information. Also, Fee teaches that the first supplemental signal may be provided as a subcarrier signal on the main signal, while Gerstel et al. disclose injecting a second supplemental signal having a different wavelength from the main signal, and it would be well understood that the two methods would create signals distinguishable from each other.

Regarding claims 25 and 92, again, Gerstel et al. disclose a supplemental signal detector, but they do not specifically disclose a first supplemental signal other than the one injected by the injector 201, and therefore, they do not specifically disclose detecting such a signal. However, Fee further teaches a first supplemental signal and teaches detecting it and causing a fault

indication to be issued depending on whether the first supplemental signal meets an expected criterion, using fault indicating means (column 14, lines 13-19). Regarding claim 25 and 92, it would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

Regarding claims 26 and 93, Gerstel et al. disclose that the detector detects the second supplemental signal (the one injected by injector 201) and causes a fault indication to be issued depending on whether the second supplemental signal meets an expected criterion, using fault indicating means (column 6, lines 30-43; column 7, lines 3-18).

Regarding claim 49, Gerstel et al. disclose in an optical network comprising at least one optical switch (Figure 2), a method for verifying optical path integrity comprising the steps of:

providing within the network at least one optical signal (via incoming line 106);

directing the network to route the optical signal to a first port of the optical switch (switch 204);

at a point before the optical signal enters a first port, adding a supplemental signal associated with the optical signal (using elements 201 and 202);;

directing the optical switch to couple the first port to a second port of the optical switch;

at the second port of the optical switch, detecting a supplemental signal (using wavemeter 210); and

responsive to the detection of a supplemental signal, determining optical path integrity in the optical network (column 5, lines 12-34).

Gerstel et al. do not specifically disclose that the at least one optical signal has associated therewith at least one first supplemental signal other than the supplemental signal that is added at a point before the signal enters a first port. However, again, Fee teaches that a signal in an optical network may include an associated supplemental signal (Figure 9 shows how ancillary data 905 can be introduced as a first supplemental signal to an optical signal). Fee also discloses that this first supplemental signal includes a modulation applied to a main optical signal (column 11, lines 22-55). Fee further discloses that this first supplemental signal may be used to provide many different types of supplemental information as desired (column 13, lines 29-60). It would have been obvious to a person of ordinary skill in the art to include a first supplemental signal as taught by Fee in the system disclosed by Gerstel et al. in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch (as disclosed by Gerstel et al.).

Regarding claim 50, it would have been obvious to a person of ordinary skill in the art to ensure that the supplemental signals were different from each so that they could be separately used for providing different information. Also, Fee teaches that the first supplemental signal may be provided as a subcarrier signal, while Gerstel et al. disclose injecting a second supplemental signal having a different wavelength from the main signal, and it would be well understood that the two methods would create signals distinguishable from each other.

Regarding claim 52, Gerstel et al. disclose establishing a first value of at least one attribute of the second supplemental signal;

at the second port, selectively detecting the second supplemental signal and determining a second value of attributes; and

determining whether the optical signal is correctly routed based upon whether the first value agrees with the second value.

In other words, Gerstel et al. disclose establishing a first, expected value for the second supplemental signal, detecting the signal at the second port and determining the "actual" detected value, and determining whether the optical signal is correctly routed based upon whether the expected value agrees with the second value (column 7, lines 9-11).

Regarding claim 51 in particular, Gerstel et al. disclose a supplemental signal detector, but they do not specifically disclose a first supplemental signal other than the one injected by the injector 201, and therefore, they do not specifically disclose detecting such a signal. However, Fee further teaches a first supplemental signal and teaches detecting it and causing a fault indication to be issued depending on whether the detected value of the first supplemental signal agrees with an established expected value (column 14, lines 13-19). It would have been obvious to a person of ordinary skill in the art to include and detect a first supplemental signal and provide additional associated fault indications as taught by Fee in the system disclosed by Gerstel et al. in order to use both supplemental signals to provide different information about faults in the system.

Allowable Subject Matter

10. Claims 31-34, 37, 53-59, 98-101, and 104 are allowed.

Response to Arguments

11. Applicants' arguments filed 29 March 2004 with regard to claims 20-26, 49-52, and 87-93 have been fully considered but they are not persuasive.

12. Applicants' arguments with respect to claims 1-19, 27-30, 35-36, 38-48, 60-86, 94-97, 102, and 103 have been considered but are moot in view of the new ground(s) of rejection.

13. Regarding claims 20-26, 49-52, and 87-93, Examiner respectfully disagrees with Applicants' assertion on page 35 of their response that Gerstel et al. teach away from including signals as taught by Fee because Gerstel et al. disclose detecting only an absence or presence of a supplemental signal while Fee teach including information in a supplemental signal. Unlike in some of Applicants' other claims, claims 20, 49, and 87 are particularly directed to a system including *two* supplemental signals. Examiner maintains that it would have been obvious to a person of ordinary skill in the art to combine a modulated first supplemental signal as taught by Fee in the system already including a second supplemental signal as disclosed by Gerstel et al. (in order to include further supplemental information in the signal as desired while providing a second supplemental signal specifically for monitoring the operation of the switch, as disclosed by Gerstel et al.). In other words, regarding the rejections of claims 20, 49, and 87, Examiner has combined an additional supplemental signal as taught by Fee into the existing system disclosed by Gerstel et al. but has not asserted *substituting* the supplemental signal of Fee for the supplemental signal of Gerstel et al. Therefore, Examiner respectfully submits that the format or nature of the existing supplemental signal disclosed by Gerstel et al. does not teach away from or preclude the addition of a further supplemental signal as taught by Fee.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Y. Leung whose telephone number is 703-605-1186. The examiner can normally be reached on Monday to Friday, 6:30 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 703-305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER